

Managing Allowance Prices in a Cap-and-Trade Program

The accumulation of greenhouse gases in the atmosphere—particularly carbon dioxide released as a result of deforestation and the use of fossil fuels—could create costly changes in regional climates throughout the world. Concern about the damage from such changes has led policymakers and analysts to consider policies designed to reduce emissions of those gases.

Many proposals have focused on cap-and-trade programs, which would limit the number of tons of greenhouse gases emitted into the atmosphere over several decades from certain sectors of the U.S. economy. Under such a program, lawmakers would set gradually tightening annual caps on greenhouse gas emissions that together would imply a cumulative limit over the duration of the policy. Rights to emit the gases, referred to as allowances, would then be distributed to businesses or other entities, such as state governments, in amounts that corresponded to those limits. (One allowance would permit one ton of emissions.) The government could distribute the allowances by either selling them, possibly in an auction, or giving them away. Once the allowances were distributed, they could be bought and sold in the secondary market for them that would develop.

Firms subject to the caps—for example, firms that emitted large quantities of greenhouse gases or that produced or imported fossil fuels that released emissions when burned—would be required to submit allowances to the agency charged with implementing the program. Under most proposed programs, firms could shift their use of allowances from one year to another by “banking” unused allowances for the future or, to a more limited degree, by “borrowing” allowances from future allocations. That trading and flexibility in timing would allow firms to undertake emissions reductions where, how, and to some extent when it was least costly for them to do so.

In choosing the level of the annual caps on emissions, policymakers would be making decisions complicated by uncertainty about the damage that might result from greenhouse gas emissions, and thus the benefits to be gained from reducing them, and about the costs of such reductions. Those costs would increase what firms spent in producing goods and services and would be borne by households in the form of higher prices. In establishing a program’s annual limits on emissions, policymakers ideally would have reliable information about the allowance prices that would be associated with the various caps they might consider. Those prices would reflect the cost of the most expensive reduction in emissions made to comply with the program at a given point in time. But projections of allowance prices are inherently uncertain. Once a cap-and-trade program was in place, actual prices would vary on the basis of current conditions, such as the weather and the economy, and firms’ expectations about factors affecting their compliance costs over the duration of the policy.

In fact, prices in the allowance market would be continually changing and could reach levels that were much higher or lower than policymakers had anticipated. Changes in prices that were caused by new information could help ensure that the caps on emissions were met at the least possible cost. Higher allowance prices, for example, would encourage firms to invest more in emissions-reducing equipment in the near term as a way to curtail their longer-term costs for meeting the caps. However, unexpectedly high (or low) allowance prices would make the cost of meeting the caps much higher (or lower) than policymakers had expected, which could alter the trade-off between costs and benefits that policymakers had anticipated when they selected the caps.

Concerns about unexpectedly high or low allowance prices have led to proposals to place upper or lower limits

on those prices. The Congressional Budget Office (CBO) has examined the possible effects of several features that would change the number of allowances available to firms at various prices and in so doing help limit the range of allowance prices.

CBO's Findings

CBO examined the effects on allowance prices and greenhouse gas emissions of three mechanisms that would help prevent allowance prices from reaching unexpected highs and lows: a *price ceiling*, which would be implemented by offering an unlimited number of allowances for sale at a given price, thereby placing an upper bound on allowance prices; an *allowance reserve*, in which a limited number of additional allowances would be offered to firms at or above a given price, thereby curtailing but not eliminating price increases beyond that level; and a *price floor*, which would be implemented by decreasing the number of allowances available at a given time to maintain a lower bound on prices.

An upper bound on allowance prices could prevent the policy's costs to the economy from being unacceptably high, but it could also cause emissions to exceed the cumulative cap because the bound would be sustained by adding allowances to the program. The effects of a lower bound would depend on whether firms could bank allowances. If banking was not permitted, a lower bound could motivate firms to make additional cuts in emissions over the duration of the policy beyond those that would otherwise be required by the cap. If banking was permitted, firms would probably not make such additional cuts.

A Price Ceiling

Policymakers could set an upper limit, or ceiling, on allowance prices by allowing firms to buy an unlimited number of allowances, in addition to those created under the cap, at a specified "ceiling price." Such a policy would have the following consequences:

- It would provide an upper limit on allowance prices but not on emissions.
- The higher the ceiling price was set above the projected path of allowance prices, the less likely it would be that firms would buy additional allowances and if they did buy them, the fewer they would buy. As a result, a higher ceiling would generally lead to fewer additional emissions than would arise under a lower ceiling.
- Provided that firms were able to shift allowances from one year to another—that is, bank and borrow them—a ceiling could dampen the price of allowances, even when the market price was below the ceiling price. Such price dampening, which would be most likely when the market price of allowances was near the ceiling price, would occur because firms would attach a lower value to an allowance today to reflect the fact that its price in the future could not rise above the ceiling price.
- If the ceiling lowered allowance prices, it would diminish firms' incentives to invest in equipment that reduced emissions and in efforts to develop new lower-cost emissions-reducing technologies. That decrease in investment would lower firms' spending for emissions reductions in the near term but could increase it in the future, when firms' compliance costs rose.

An Allowance Reserve

Alternatively, policymakers could offer to sell firms a limited number of "reserve" allowances at or above a given price, referred to here as an "access price." Such a reserve would have the following effects:

- It would impose an upper limit on emissions—which might be different from the cap—but would not set an upper limit on the price of allowances.
- The environmental and economic consequences of using the allowances in the reserve would depend on whether the reserve increased or decreased the number of allowances that would otherwise be permitted under the cap.
 - A reserve created by *supplementing the number of allowances supplied under the cap* would allow a limited loosening of the cap when costs were high. A supplemental-allowance reserve would tend to increase emissions and lower allowance prices relative to a policy with the same cap but no reserve. All else being equal, the larger the reserve and the lower the access price for releasing the allowances it contained, the more likely that the reserve would dampen allowance prices and allow emissions to exceed the cap.
 - A reserve created by *withholding allowances that would otherwise be distributed under the cap* could increase firms' compliance costs but allow fewer

emissions than those under a program with the same cap but no reserve. All else being equal, the larger the reserve and the higher the access price, the more likely that the reserve would increase prices and curb emissions to a greater extent than would a similar program without a reserve.

- The effect of a reserve on emissions and allowance prices might be greater but would be less certain if regulators could restock the reserve by using offset credits, which reflect reductions in domestic or overseas emissions that would not otherwise be subject to the cap. Under such an approach, regulators would purchase the credits, then retire them and add a corresponding number of allowances to the reserve. Allowing regulators to restock the reserve in that way could lower firms' costs for compliance because the number of reserve allowances would rise. However, that reliance might also prompt questions about the credibility of the cap: Regulators could find it challenging to verify that offset credits represented actual reductions relative to projected emissions in the absence of the cap-and-trade program.
- If the federal government used auctions to sell the reserve allowances it created, it would capture their full value. Alternatively, if the reserve allowances were distributed by offering firms options to purchase them at a fixed price, the government and firms would share the allowances' value.

A Price Floor

Another approach, a price floor, would set a lower limit on the price of all traded allowances. With a "hard" price floor, the simplest form of such an approach, the government would be required to purchase an unlimited number of allowances at a predetermined price. Broadly speaking, including a price floor in a cap-and-trade program would tend to boost allowance prices in the near term but would probably not result in fewer emissions over the duration of the policy if firms were permitted to bank allowances. CBO's analysis also indicates the following:

- The further below the projected path of allowance prices that the floor price was set, the less likely it would be that the floor would become binding—that is, prevent any further decline in prices.
- At the time that it was binding, a price floor would increase firms' compliance costs, relative to a policy

with the same cap and no price floor, because it would require firms to reduce emissions more than they otherwise would.

- To the extent that a price floor increased the price of allowances, it would strengthen firms' incentives to invest in emissions-reducing capital equipment and to develop new lower-cost technologies for reducing emissions. Those investments would boost firms' spending in the near term but decrease their compliance costs (and lower allowance prices) in the future.
- If firms could shift allowances from one period to another, a price floor would probably not result in cumulative emissions over the life of the policy (typically several decades) that were less than the amount permitted under the policy's cap. Instead, a floor would shift reductions forward in time.
- Policymakers could try to set a lower limit on the price of allowances by establishing a minimum bid price for the allowances sold in a government-run auction. But that bid price would establish a floor for prices in the secondary market only if the demand for allowances was great enough that firms would want to buy at least some of the allowances being auctioned.

Unintended Consequences of Managing Allowance Prices

Actual experience in managing allowance prices through the approaches that CBO examined is quite limited, which could make it harder to anticipate the effects of such features if they were included in a cap-and-trade program for greenhouse gas emissions. For example, a hard price floor might turn out to be very costly to implement. Also, some analysts are concerned that a price ceiling or an allowance reserve could result in allowances being added to the program under circumstances—including firms' attempts to manipulate allowance prices through those features—that in the end might not be justified by actual compliance costs. A further consideration is that the mere presence of a price ceiling or a price floor might cause allowance prices to gravitate toward those levels. Moreover, allowing firms to buy an unlimited number of allowances at a ceiling price could complicate possible efforts to tighten the annual caps in the future: Firms could bank allowances during the time that the price ceiling was in effect and then use those allowances to exceed the tighter caps established for future periods.